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ABSTRACT

The following four hypotheses were tested: (1) nonmetropolitan areas with the highest percentages employed in industry in 1960 will experience the greatest inmigration between 1965-70; (2) those with a high percentage employed in agriculture will experience the lowest amounts of inmigration; (3) those areas with small farm size and low farm income in 1960 will experience low inmigration rates; and (4) nonmetropolitan areas close to metropolitan centers will experience the highest rates of inmigration. Employing the nonmetropolitan State Economic Area (SEA) unit and utilizing U.S. census data, migration rates were calculated for each of the nonmetropolitan SEA's in Texas, Louisiana, Oklahoma, and Arkansas. Total inmigration, inmigration from the nonmetropolitan and metropolitan SEA's, and net migration were calculated for the population 5 years and older in 1970. Some results were: positive correlation between inmigration and net migration and percent employed in industry but negative correlation between inmigration and net migration and percent employed in agriculture; negative correlation between inmigration and agriculture regardless of size of farm; and positive correlation between net migration and proximity to large Standard Metropolitan Statistical Areas. (JC)

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ECOLOGICAL CORRELATES OF INMIGRATION TO NONMETROPOLITAN AREAS

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M.S.E.

ECOLOGICAL CORRELATES OF INMIGRATION TO NONMETROPOLITAN AREAS

Introduction

Contemporary research on migration in the U.S. has focused largely on rural to urban migration. A continuation of this emphasis, however, may no longer be justified. Beale (1964) notes that "the bulk of the demographic adjustments stemming from agricultural changes has now taken place." Recent evidence lends empirical support to the reduced importance of the rural to urban migration stream. Between 1960 and 1970, net inmigration from nonmetropolitan areas to metropolitan areas approximated 2.3 million people, accounting for only about 11 percent of the total change, due to migration, in metropolitan areas. More importantly, however, are the findings of a recent Current Population Survey (1973) which reported that "between March 1970 and March 1973, more persons moved away from metropolitan areas than moved into metropolitan areas." The survey reported that 4,680,000 moved from metropolitan areas to nonmetropolitan areas, and 3,736,000 moved from nonmetropolitan areas to metropolitan areas. There was a net gain of 944,000 people for nonmetropolitan areas. This movement represents a reversal of nearly 100 years of nonmetropolitan to metropolitan migration. Previously, the

dominant stream had always been nonmetropolitan to metropolitan with only a modest reverse migration stream.

Methodologically, the reversal of this stream is in part an artifact of a diminishing nonmetropolitan-metropolitan stream, a product of the reduction in the population base in rural areas due to heavy out-migration to urban areas. Conversely, the increased population in urban areas increases the population base exposed to the risk of migration and accordingly raises the volume of metropolitan-nonmetropolitan migration stream. Whatever its significance, it is unlikely that this factor can be fully responsible for the significant reversal of the dominant migration stream. Migration to nonmetropolitan areas has received scant attention and little is known about the phenomenon, although the evidence cited would appear to justify investigation. In this paper we focus on migration to nonmetropolitan regions and hopefully will shed light on a neglected area.

Approach to the Study of Migration

Many approaches have been employed to describe, analyze, explain, and predict migration behavior. These

approaches may be crudely dichotomized into (1) attempts to treat migration at a microlevel with a focus on the individual and (2) attempts to view migration as a population phenomenon with analysis at the aggregate or macro level. Most microlevel attempts are usually couched in terms of a push-pull model. Lee's "Theory of Migration" (1966) exemplifies this approach. However, microlevel approaches may well be fraught with theoretical and methodological difficulties. Sly (1972) notes that, "One must bear in mind that values and motives are themselves part of the behavior, and as such, should be explained rather than be used as the explanation. 'Characteristic' types of explanation likewise are seldom tied to more general frames of reference tend to be ad hoc description, or ex post facto." Likewise, macrolevel approach, usually utilizing a gravity model, may also be suspect theoretically and methodologically. Variables used in gravity models almost always employ concurrent migration flow, restricting the model's utility to ex post facto descriptions, and providing a minimum of predictive power. Lowry (1966) notes that migration analysis would be better served by models with more explicit causal structure--one in which variables other than migration help to "explain" migration.

Sly (1972), following the works of Hawley (1950) and Duncan (1959), has formulated a model with a much more explicit causal structure utilizing an ecological approach. He postulates that migration is a population response to changes in sustenance organization, which in turn can be affected by change in technology and environment. Migration is a response through which a population can maintain an equilibrium between its size and its sustenance organization. Change in a system's organization produces a disequilibrium between population and organization. When such an imbalance exists the population may alter itself demographically through an adjustment in its levels of fertility, mortality, or migration. Sly argues that the migration response appears to be the most efficient one. Sly operationalizes the ecological constructs of sustenance organization, technology, and environment and tests his model with an examination of Southern Black migration rates and receives general support for an ecological approach. Previous micro and macro level approaches have failed in one way or another in postulating and employing a truly explicit causal model. The ecological approach comes close to achieving this criterion, and thus would seem a likely candidate for utilizing in examining migration to nonmetropolitan areas.

Earlier Studies

Although there is a paucity of research concerning nonmetropolitan migration, the area has not been neglected entirely. Population change in particular has received some attention. We focus now on the limited literature on population change and migration in nonmetropolitan areas. A review of this literature may aid in developing some hypotheses about nonmetropolitan migration, a key component of nonmetropolitan population change.

Tarver and Beale (1969) have observed that changes in manufacturing employment exerted the greatest influence upon the 1950-1960 population changes of Southern towns. Changes in public administration workers followed as important influences. Tarver and Beale (1968) examined four variables and hypothesized that they should account for the 1950-1960 population changes of nonmetropolitan towns and cities in the South. Size of place in 1950 was the most important variable, with 1950-60 population increase positively associated with it. The second most important variable was regional location with county seat status, and distance to the nearest metropolitan center following in importance.

A number of studies (Fuguitt, 1965; 1971; Beale, 1964; DeAre and Poston, 1972) have shown that nonmetropolitan population size varies directly with proximity to, and size of, metropolitan centers. Tarver (1972) attempted to relate the pattern of population growth and decline to the industrial structure of Southern nonmetropolitan towns and cities. He classified these nonmetropolitan towns by industrial function and industrial structure. He defined "multiple-speciality" towns as those dependent on more than one industry. He found that industrial structure at the beginning of a decade exerted a pronounced influence upon the population during the ensuing decade. Towns classified "multiple-speciality" experienced the highest rate of population increase, while "one speciality" towns had low rates of population increase or decline. Of the one speciality towns, professional, public administration, and wholesale-retail trade centers had the highest rate of population growth, while agricultural centers suffered the greatest reduction of all, going from an increase of 27.4 percent in 1950-60 to 2.5 percent increase in 1960-70.

Concerning migration to nonmetropolitan areas, Zuiches (1970) has examined inmigration to nonmetropolitan urban places. His general hypothesis was that differentials

in economic, functional, and ecological characteristics of the urban places will be systematically related to the levels of inmigration. A positive association was found between volume of inmigration and size of place, proportion of the labor force in nonmanual occupations, and high levels of college or military activity. Areas of nigh unemployment were inversely associated with the volume of inmigration.

Kirschenbaum (1971) examined metropolitan to nonmetropolitan migration utilizing an ecological perspective. He hypothesized that recent ecological changes in the structure of metropolitan areas and nonmetropolitan areas have resulted in migration to nonmetropolitan areas. He cites factors of deconcentration and relocation of economic units outside organized areas; coupled with organizational and occupational specialization, there results movement of industrial units to rural areas. To quote him at length:

> Technological improvements in transportation and communication have reduced time-cost factors, a primary component influencing industrial site locations. Factors such as union and wage differences, transportation arteries linking markets and sources of materials, greater availability of land for expansion, lower taxes, and pollution hazards are important considerations.

The literature suggests several testable hypotheses which may be examined within an ecological framework to understand metropolitan-nonmetropolitan migration.

Hypotheses

The following hypotheses will be grouped under an appropriate ecological rubric. (One may reclassify several of these hypotheses, of course depending upon one's interpretations of the ecological rubrics.)

Organizational. (1) According to previous research (Tarver, 1972; Kirschenbaum, 1971; Zuiches, 1971) industrial structure in nonmetropolitan areas is related to population change and inmigration. Specifically, those nonmetropolitan areas with the highest percentages employed in industry in 1960 would experience the greatest inmigration between 1965-1970.

(2) Conversely, those nonmetropolitan areas with a high percentage employed in agricultural will experience the lowest amounts of inmigration in the 1965-1970 period.

Technological. (1) Increasing mechanization of farming will lead to increased farm sizes, decreased employment in agriculture, and increased farm income. These will

result in low inmigration to the nonmetropolitan areas under investigation. Therefore, those areas with small farm size and low farm income in 1960 should experience low inmigration rates in the 1965 to 1970 period.

Environmental. (1) Previous research (Fuguitt, 1971; Tarver, 1972) suggests that nonmetropolitan areas located in close proximity to metropolitan areas will grow in population size more rapidly than those located distant from metropolitan centers. Therefore, the nonmetropolitan areas close to metropolitan centers will experience the highest rates of inmigration.

Data and Methods

The unit of analysis to be employed is the nonmetropolitan State Economic Area (SEA); we will examine inmigration to nonmetropolitan SEA's in the West South Central States of the United States. State Economic Areas are relatively homogeneous subdivision of States. They consist of single counties or groups of counties that have similar economic and social characteristics. SEA's are classified as either, metropolitan or nonmetropolitan. Metropolitan SEA's are the larger Standard Metropolitan

Statistical Areas, that is, those SMSA's with a population of 100,000 or more. In nonmetropolitan areas, demographic, climatic, physiographic and cultural factors, as well as factors pertaining more directly to the production and exchange of agricultural and nonagricultural goods, were considered. The original delineation of State Economic Areas (see Beale, 1961) involved a consideration of numerous and diverse factors of maximize the homogeneity of the areas; sixty-four statistical indexes were employed, with the weight given to each index allowed to change in relation to its importance in the entire economy characterizing the areas.

Inmigration into the nonmetropolitan SEA's of the West South Central Census Division of the U.S. (the states of Texas, Louisiana, Oklahoma, and Arkansas) is the dependent variable to be examined. We do not pretend to suggest that these states are representative of the entire United States although the range in urbanization of these states suggests that this particular census division includes a heterogeneous group of areas with which to examine the delineated hypotheses.

Data Source

Migration is reported for State Economic Areas in a Subject Report of the 1970 U.S. Census of Population: Migration Between State Economic Areas. This volume provides SEA residence in 1965 cross-tabulated by SEA residence in 1970. Migration rates were calculated for each of the nonmetropolitan SEA's in Texas, Louisiana, Oklahoma, and Arkansas. Four measures of the dependent variable were calculated for the population five years old and over in 1970; (1) Total inmigration; (2) Inmigration from nonmetropolitan SEA's; (3) Inmigration from metropolitan SEA's; (4) Net migration.

Essential to this analysis is the dichotomization of inmigration by origins of migrants. Correlation will be calculated for migration to nonmetropolitan SEA's where the origin was either another nonmetropolitan SEA or a metropolitan SEA. It may well be the case that independent variables correlatingly significantly with inmigration from metropolitan SEA's will differ from those that correlate highly with inmigration from nonmetropolitan SEA's.

Variation in the Region

When we dichotomize the inmigration rates to nonmetropolitan SEA's by metropolitan and nonmetropolitan place of origin, a fairly even flow of migrants from each area of origin is revealed. Migrants from nonmetropolitan areas exceed slightly in number the migrant stream originating from metropolitan SEA's as shown in Table 1. The net migration figures show that the total inmigration rate is offset by a slightly higher outmigration from nonmetropolitan SEA's in the West South Central Division. Table 1 reveals that within the region there is a great amount of variability for each measure of the dependent variable. In addition, the net migration data show the variation in SEA's ranging from those experiencing net inmigration to those experiencing net outmigration.

Oklahoma has the highest total inmigration rate in the region, while Louisiana has the lowest amount of inmigration to nonmetropolitan areas. The majority of Oklahoma's inmigration to nonmetropolitan SEA's is the result of migration from other nonmetropolitan SEA's, while Texas (the most urbanized state in the region) has the majority of its inmigrants to nonmetropolitan SEA's originating from metropolitan SEA's. While Oklahoma and Texas are

TABLE 1

VARIATION IN MIGRATION TO NONMETROPOLITAN SEA'S

Type of Migration By Region And State	Mean	Standard Deviation	Maximum	Minimum
Region				
Total In	17.18	5.49	31.05	7.25
Nonmetro In	8.83	3.07	16.49	3.63
Metro In	8.36	3.29	16.20	3.16
Net	-.51	5.74	+12.79	-12.20
Total Out	17.69			
Texas				
Total In	16.69	4.47	26.14	7.76
Nonmetro In	8.43	2.51	14.49	3.63
Metro In	9.32	3.14	15.47	4.13
Net	-2.08	7.02	+10.73	-12.20
Total Out	19.77			
Arkansas				
Total In	16.34	4.69	27.06	11.74
Nonmetro In	9.16	2.48	15.49	6.91
Metro In	1.09	5.01	+11.14	-6.17
Total Out	15.25			
Oklahoma				
Total In	20.21	3.33	25.83	16.05
Nonmetro In	11.03	2.47	16.49	8.34
Metro In	9.18	2.41	13.36	5.82
Net	.38	3.02	+6.91	-4.20
Total Out	19.83			
Louisiana				
Total In	13.29	7.33	31.06	7.25
Nonmetro In	6.51	3.38	14.85	4.08
Metro In	6.71	4.24	16.20	3.16
Net	-.26	5.46	+12.79	-6.46
Total Out	13.55			

experiencing the highest inmigration rates to nonmetropolitan SEA's, Table 1 reveals that they are also experiencing the highest outmigration movements. Arkansas, while having a relatively low total inmigration rate, has the highest net inmigration in the region. Louisiana's low total inmigration rate is the result of an extreme amount of variation within the state since Louisiana has the SEA with the highest rate of inmigration in the region and the SEA with the lowest rate of inmigration in the region.

Relationship Between
Dependent Variables

An important question to be examined at this point concerns the degree to which there are important relationships among the variations on dependent variables. Is there a correlation between migration from metropolitan areas and net inmigration; between nonmetropolitan inmigration and net inmigration; between metropolitan and nonmetropolitan inmigration. The zero-order correlations (see Table 2) attempt to answer these questions.

The zero-order correlations for the region reveal an expected association between nonmetropolitan and total, and metropolitan and total inmigration rates. Since

TABLE 2

ZERO-ORDER CORRELATIONS FOR THE REGION

Nonmetro - Total:	.84
Metro - Total:	.86
Net - Total:	.59
Nonmetro - Metro:	.47
Nonmetro - Net :	.40
Metro - Net :	.65

each rate, metro and nonmetro, contributes to the total rate, it should be expected that there will be a high correlation between these rates; this expectation is confirmed.

Of significance is the disparity between the correlation of the nonmetropolitan-net migration and metropolitan-net migration rates. The relatively high metropolitan-net migration correlation of .65 suggests that metropolitan inmigration to a nonmetropolitan SEA plays an important role in determining whether an SEA will experience net in-or net outmigration. However, the same statement cannot be made in regard to the relationship between nonmetropolitan inmigration and net migration.

The following four fold tables better illustrate the influence of metropolitan inmigration in determining whether the SEA will experience net in-or net outmigration. Those SEA's experiencing high metropolitan inmigration will also have net inmigration regardless of whether it experiences low or high nonmetropolitan inmigration. Only 4 SEA's with low metropolitan inmigration experienced net inmigration (see table 4). Conversely, Table 5 reveals that those SEA's with low metropolitan inmigration will experience net outmigration regardless of nonmetropolitan inmigration. The deviant cases, in this instance, were 2

TABLE 3

CROSSTABULATION OF NONMETRO IN-MIGRATION

BY METRO IN-MIGRATION

		Metropolitan In-Migration Low	High
Nonmetropolitan In-migration	Low	15	9
	High	8	11

Chi Square = 1.04 with 1 D.F. - Sig. = .3060
Phi = .20306

TABLE 4

CROSSTABULATION OF NONMETRO IN-MIGRATION BY METRO IN-MIGRATION CONTROLLING FOR NET IN-MIGRATION

		Metro In-Migration Low	Metro In-Migration High
Nonmetro In-Migration	Low	1	8
	High	3	10

Chi Square = .02350 with 1 D.F. = Sig. = .8782

Phi = .15253

TABLE 5

CROSSTABULATION OF NONMETRO IN-MIGRATION BY METRO IN-MIGRATION CONTROLLING FOR NET OUT MIGRATION

		Metro In-Migration Low	Metro In-Migration High
Nonmetro In-Migration	Low	14	1
	High	5	1

Chi Square = .01382 with 1 D.F. = Sig. .9064

Phi = .15390

SEA's that experienced high metropolitan inmigration but had net outmigration. Table 6 clearly illustrates the integral relationship between metro inmigration and net migration.

The relationship between net migration and total inmigration is clarified by reference to Table 7. Those SEA's with high total inmigration also experience net inmigration, and those with low total inmigration experience net outmigration, with a few exceptions. Therefore, from the above discussion and examination of Tables 4-7, it appears that total inmigration and inmigration from metropolitan areas play significant roles in determining whether a nonmetropolitan SEA will experience net inmigration. Tables 8 and 9 illustrate the nature of this relationship.

Only one SEA with low total inmigration and low metropolitan inmigration experienced net inmigration, and only two SEA's with high total inmigration and high metropolitan inmigration experienced net outmigration. Metropolitan inmigration and total inmigration appears to be determining factors in the growth or decline of an SEA through net migration.

The analysis of variation in migration rates to nonmetropolitan SEA's in the region, and the relationship

TABLE 6

CROSSTABULATION OF METROPOLITAN IN-MIGRATION

BY NET MIGRATION

		Net Migration Out	In
Metro In-Migration	Low	19	4
	High	2	18

Chi Square = 19.759 with 1 D.F.; Sig = .000

Phi = .72451

TABLE 7

CROSSTABULATION OF TOTAL IN-MIGRATION

BY NET MIGRATION

		Net Migration Out	In
Total In-Migration	Low	16	5
	High	5	17

Chi Square = 10.244 with 1 D.F.; Sig = .001

Phi = .53453

TABLE 8

CROSSTABULATION OF METRO IN-MIGRATION BY NET MIGRATION

CONTROLLING FOR LOW TOTAL IN-MIGRATION

		Net Migration Out	In
Metro In-Migration	Low	16	1
	High	0	4

Chi Square = 11.049 with 1 D.F.; Sig = .001

Phi = .86772

TABLE 9

CROSSTABULATION OF METRO IN-MIGRATION BY NET MIGRATION

CONTROLLING FOR HIGH TOTAL IN-MIGRATION

		Net Migration	
		Out	In
Metro In-Migration	Low	3	3
	High	2	14

Chi Square = 1.685 with 1 D.F.; Sig. = .1943 Phi = .3985

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among the dependent variables, as delineated above, raises several questions. The primary question to be addressed is concerned with determining what ecological variables are associated with inmigration to nonmetropolitan SEA's. This question may be dichotomized into the components of inmigration to these areas. Specifically, these questions focus on what variables are associated with those SEA's experiencing high inmigration from metropolitan areas; from nonmetropolitan areas; from both metropolitan and nonmetropolitan areas? Conversely, what factors are associated with those SEA's experiencing low inmigration from metropolitan areas? Are different ecological variables associated with SEA's that have different sources of migrants? These are important questions for human ecologists, and it is hoped that answers to them will provide us with a better understanding of migration's role in ecological adaptation.

Ecological Correlates of Inmigration to Nonmetropolitan State Economic Areas

Examination of Hypotheses

Although support appears to be generated for the hypotheses delineated earlier, it appears that the

formulation of the hypotheses may have been too brief for a full specification of the relationships. We will hence attempt to specify more clearly the posited relationships between the ecological variables and migration.

Organizational Variables

Tables 10-12 present the correlation coefficients dealing with the organizational variables and migration. Total inmigration and net migration are positively correlated with percent employed in manufacturing and other industries, while total inmigration and net migration are negatively correlated with percent employed in agriculture (see Table 10). Table 11 reveals that these relationships hold across occupational categories, with negative correlations between farm laborers and migration, and positive correlations for laborers and craftsmen and inmigration. However, these tables also suggest that there are other associations between organizational structure and inmigration to nonmetropolitan SEA's. In addition to the negative correlations that exist between percent employed in agriculture and inmigration, there are also negative correlations that exist between personal services and transportation.

TABLE 10

ZERO-ORDER CORRELATIONS BETWEEN INDUSTRY OF THE EMPLOYED, 1960 AND MIGRATION 1965-70

Industry (Percent Employed, 1960)	Migration (1965-70)			
	Nonmetro In	Metro In	Total	Net
Agriculture	-.0349	-.2596	-.1718	-.2992
Personal Service	-.4469	-.2546	-.4094	-.1333
Transportation	.0940	.0279	.0669	-.2323
Manufacturing	-.0808	.2047	.0729	.4765
Nondurable Goods	-.2600	-.1143	.2137	.1666
Wholesale	.2776	.1202	.2788	-.1498
Finance, Insurance, Real Estate	.1463	.2709	.2409	.1296
Public Adminstration	.3745	.3280	.4416	.0802
Educational Services	.3205	.2456	.3295	.2717
Professional	.3945	.3640	.4412	.3695

TABLE 11

ZERO-ORDER CORRELATIONS BETWEEN OCCUPATION OF THE EMPLOYED, 1960 AND MIGRATION 1965-70

Occupations (Percent Employed 1960)	Migration (1965-70)			
	Nonmetro In	Metro In	Total In	Net
Professional	.2870	.3703	.3834	.1848
Farm Managers	.3259	.0409	.2110	.0453
Managers	.4085	.1286	.3072	-.0771
Clerical	-.0193	.0986	.0433	.0964
Crafts	.1642	.3999	.3297	.3232
Sales	.1581	.0676	.1254	.1667
Operatives	-.4108	-.2717	-.3977	-.0304
Private	-.2441	-.1354	-.2240	-.0046
Farm Laborer	-.2545	-.3102	-.3268	-.5398
Labor	-.2570	.0519	.1149	.3503
Division of Labor	.1227	.1970	.1875	-.1040

TABLE 12

ZERO-ORDER CORRELATIONS BETWEEN INDUSTRIAL AND OCCUPATIONAL SECTORS (1960) AND MIGRATION (1965-70)

Sectors	Migration			
	Nonmetro In	Metro In	Total In	Net
Primary 1	-.0364	-.2605	-.1732	-.3014
Primary 2	-.0315	-.2514	-.1686	-.2966
Secondary	-.1155	.1549	.0249	.4468
Tertiary	.4295	.4055	.4877	.2430
Capital Intensive	.5743	.3245	.5200	.1988
Labor Intensive	-.5626	-.3651	-.5368	-.2318

Primary 1 = Percent Agriculture + Percent Farm Laborer
Primary 2 = Percent Agriculture + Percent Farm Managers
Secondary = Percent Manufacturing + Percent Nondurable + Percent Retail
Tertiary = Finance, Insurance, Real Estate + Percent Educational + Percent Public Administration

Capital Intensive = Percent Professionals + Percent Farm Managers + Percent Managers + Percent Craftsmen
Labor Intensive = Percent Operatives + Percent Private Household Workers + Percent Farm Laborers + Percent Laborers

Contrasting these associations, there are positive correlations between total in and net migration and percent employed in public administration, finance, insurance, real estate, educational services, and professionals. Similar associations hold with the occupational variables.

The hypothesis that a high percentage of agricultural employment in 1960 would be negatively associated with inmigration in the 1965-70 period, was based on the expectation that the increasing mechanization of farming would reduce the employment opportunitites in agriculture and result in little inmigration and high outmigration in these areas. Simultaneously, the move from labor-intensive to capital-intensive production made it more economical and efficient to consolidate small farms into large ones, and, subsequently, to move to agribusinesses, with its large farms, highly mechanized, needing little manpower. Consequently, this also may have impacted the organizational structure of rural communities. Specifically, small towns providing personal service to numerous small farms in the immediate vicinity were displaced with the demise of the small farm. Similarly affected were other supportive services, specifically the transportation, communication, and other public utility industries which

supplied the rural communities. The interconnections of the organizational structures of these nonmetropolitan agricultural areas were affected by the change to large agribusinesses; consequently negative association between the variables and inmigration were the result.

A similar argument may be utilized to explain the positive correlations found in association with the posited relationship for manufacturing and inmigration. Those metropolitan SEA's with a high percentage employed in industrial occupations, such as manufacturing, in 1960 had a positive correlation with total in- and net migration for the 1965-70 period. Similar observations may be noted for those employed in finance, insurance, real estate, educational services, and professionals. Again, these relationships hold across occupational categories. As the structural organizations of agriculture, transportation, and personal services were integrally interrelated, a similar interdependent organizational structure resulted for those nonmetropolitan SEA's with developed or developing industrial or secondary service sectors. It appears that the greater the amount of industrial employees, the greater the need for a supportive service sector, the greater the inmigration.

Division of the industrial classifications into the three basic sectors of primary, secondary, and tertiary production (see Table 12) provides support for these hypotheses. The primary category of agriculture is crudely dichotomized into small farms (percent employed in agriculture and percent farm laborers) and large farms (percent employed in Agriculture and percent Farm Managers). Negative correlations are found for both primary classifications with net and total-inmigration. Secondary and Tertiary classifications are positively correlated with inmigration. Table 14 also dichotomizes occupational categories as labor-intensive or capital-intensive. Those nonmetropolitan SEA's dominated by labor-intensive occupation were negatively correlated with inmigration, while capital-intensive occupations were positively correlated with inmigration. Labor-intensive occupations, mostly agricultural, were displaced by mechanization of farming. However, capital-intensive production, characterized by manufacturing began to develop in nonmetropolitan areas and necessitated a supporting tertiary service sectors. Those nonmetropolitan SEA's attracting inmigrants resembled more closely metropolitan industrial structures as opposed to those nonmetropolitan SEA's with agrarian structures.

Technological Hypothesis

Again, the analysis of data reveals that the technological hypothesis, primarily concerned with the mechanization of agriculture in nonmetropolitan SEA's, may have been simplistically formulated. In 1960, two agricultural systems can be identified, the small farm system and the large commercial farm system. The small farm system was rapidly dying and being replaced by the large, efficient, mechanized, commercial farms. Several factors, however, mediated this transition. Large commercial farms enjoyed immense advantages over small farmers when urban markets were distant. Ths is to say, the large-scale production and transportation of agricultural products to distant urban centers was much more efficient and economical for large commercial farms than small farms. However, these advantages were partially neutralized by location close to metropolitan markets. The closer to these urban areas, the more expensive and difficult to organize large scale commercial farms, and, moreover, the transportation and time-cost factors were effectively reduced. Therefore, while small farms were being eliminated in the more rural areas, large commercial farms could not be established close to

metropolitan centers. The correlations of number of farms under 10 acres with the distance and size-distance measures (-.309 and .308, respectively) and the similar correlations for number of farms greater than 1000 acres (.326 and -.386, respectively) provide some support for this hypothesis. The distance measure indicates distance from an SMSA, i.e., the higher number, the greater the distance. Thus the negative correlation for small farms and the positive correlation for large farms indicates few small farms distant from SMSA's, but a high number of large farms. Conversely, i.e., the size-distance measure indicates closeness to a large SMSA, the larger the number, the closer to an SMSA (weighted by size of SMSA). In this instance, the positive correlation with small farms and the size-distance measure indicates that the closer to an SMSA the greater the number of small farms, and the negative correlation suggests that few large commercial farms are close to SMSA's. This factor is important in the dichotomy between origin of migrants and inmigration, to be discussed later. Table 13 indicates that negative correlations exist between inmigration and agricultural activity, regardless of type of farm. Small farms eliminate employment opportunities as well as large farms. The more land in farms, large or

TABLE 13

ZERO-ORDER CORRELATIONS BETWEEN TECHNOLOGICAL INDICATORS, 1960 AND MIGRATION, 1965-1970

Technological Indicators (1960)	Migration (1965-70)			
	Nonmetro In	Metro In	Total In	Net
Median Income	.2400	.0557	.1678	-.3623
Family Income < $3000	-.2521	-.0799	-.1882	.3466
Family Income > $10,000	.0936	-.0815	.0034	-.5642
Median Education	.5437	.3781	.5300	-.0270
Percent Land in Farm	.2385	.1118	-.2031	-.3672
No. Farms < 10 Acres	-.5358	-.1991	-.4323	-.0061
No. Farm > 1000 Acres	.1979	.0431	.1360	.3818
Commercial Farm < $2500	-.3604	-.1914	-.3272	.0610
Commercial Farm > 10,000	.0393	-.1134	-.0482	-.4982
Percent Farms Large Commercial	.1799	-.2000	-.0165	-.6666

small, the less the inmigration. With the introduction of large-scale mechanized agribusiness, few opportunities exist for new employment in agriculture.

Environmental Hypothesis

Table 14 provides partial support for the environmental hypothesis. The weighted size-distance measure strongly supports the hypothesis. Net migration is positive correlated with proximity to large SMSA's. Those nonmetropolitan SEA's located close to large metropolitan centers are characterized by net inmigration in the 1965-70 period. However, no significant association was found for the distance measure and net migration. A significant positive correlation was found between percent employed working out of county and net migration. Specifically, this surrogate measure for proximity shows a correlation between percent with distance is -.320, meaning that the further from an SMSA the fewer percent working out of county. Conversely, the size-distance correlation with out of county w rkers is .319, or the closer to an SMSA, the greater the percent working out of county.

TABLE 14

ZERO ORDER CORRELATIONS BETWEEN ENVIRONMENTAL INDICATORS, 1960 AND MIGRATION, 1965-70

Environmental Indicators (1960)	Migration (1965-76)			
	Nonmetro In	Metro In	Total In	Met
Distance	.4396	-.0491	.2263	-.0933
Size Distance	-.0293	.2743	.1464	.5634
Worked out-of-county	-.1580	.2026	.0307	.5152

No p 38 in original document; numbering error.

Summary

The analysis presented above can more clearly and concisely be summarized as follows. Technological change (mechanization of farming, improved transportation systems) coupled with environmental factors (both the increasing unavailability of land and labor in metropolitan areas and the distance factors in nonmetropolitan areas) resulted in a change in the sustenance organization of nonmetropolitan SEA's. The response to the disequilibrium in sustenance organization was migration. The migration response from metropolitan areas was a somewhat different response to the organizational changes than the migration response of nonmetropolitan migrants. Technological changes resulted in the destruction of the small farm system and its supportive structures in areas distant from metropolitan centers. Similarly, technological improvements in transportation and the reduction in time-cost factors are also responsible explanatory factors in the relocation of industrial units in nonmetropolitan SEA's close to urban markets, and the resulting development of a supportive tertiary service sector. These findings emphasize the importance of examining the complex interdependent networks

established in these areas and the important consequences of changes and disequilibrium in any of the systems. Contemporary problems such as the current energy crisis might have even more crucial consequences than the present problems already evident, and, certainly, the policy implications for government planning agencies and projects (such as the failure of the New Town movement) may take note of the consequences of manipulating variables in a complex setting.

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